SCIENTIFIC AMERICAN.

THE ADVOCATE OF INDUSTRY AND ENTERPRISE, AND JOURNAL OF MECHANICAL AND OTHER IMPROVEMENTS.

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THE SCIENTIFIC AMERICAN,

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(The Principal Office being at New York,)

BY PORTER & MALLERY.

RUFUS PORTER,—Editor.

Each number of this paper is furnished wi h from two to five ORIGINAL ENGRAVINGS, many of them elegant, and illustrative of NEW INVENTIONS, SCIENTIFIC PRINCIPLES, and CURIOSITIES; and contains as much Interesting Intelligence as six ordinary daily papers, consisting of notices of the progress of Mechanical and other *Scientific Improvements*,—American and Foreign Inventions; Catalogues of American Patents;—Scientific Essays, illustrative of the principles of the Sciences of Mechanics, Chemistry, and Architecture;—Instruction in various Arts and Trades;—curious Philosophical Experiments;—Miscellaneous Intelligence, Poetry, and, occasionally, Music.

This paper is especially entitled to the patronage of Mechanics and Manufacturers, being the only paper in America devoted to the interests of those classes; but is particularly useful to Farmers, as it will not only apprise them of improvements in agricultural implements, but iustruct them in various mechanical trades, and guard them against impositions. As a family newspaper, it will convey more useful intelligence to children and young people, than five times its cost in school instruction. Another important argument in favor of this paper, is, that it will be worth two dollars at the end of the year, when the volume is complete, and will probably command that price in cash, if we may judge from the circumstance that old volumes of the "New York Mechanic," by the same editor, will now command double the original cost.

TERMS.—"The Scientific American" will be furnished to subscribers at $2, per annum,—one dollar in advance, and the balance in six months.

Five copies will be sent to one address six months, for four dollars in advance.

Any person procuring two or more subscribers, will be entitled to a commission of twenty-five cents each.

TERMS OF ADVERTISING.—For 10 lines, or less, 50 cents for the first, and 12 1-2 cents for every subsequent insertion.

Jack Frost.

"O, ho! O, ho!" quoth old Jack Frost,
As he sped on his wint'ry way;
And he laughed, delighted,
As he nipped and blighted
The things men deemed most gay.
He made the old oak, and the poplar tall,
Bend low at his stormy blast,
And the last yellow leaves to quiver and fall
Before his might as he passed.

"O, ho! O, ho!" quoth old Jack Frost,
As he looked at the farmer's fireside,
And saw the huge log
On the bright fire-dog,
And a flagon and tankard beside;
And heard the gay jest, and the loud merry laugh,
As they trill'd forth their Christmas rhymes,
How happy they grew as the liquor they'd quaff—
Jack gave a huzza for old times!

"O, ho! O, ho!" quoth old Jack Frost,
As a nobleman's house he passed through,
And saw turkey and chine,
And brandy and wine;
"These, indeed, are rare times for you."
And the rich man dozed in his easy arm-chair,
And his fire blazed fiereely and bold;
But he never thought of one morsel to spare,
For those that were hungry and cold.

"O, ho! O, ho!" sighed old Jack Frost,
As he look'd in the poor man's hut,
Dark, dirty and drear,
And no fire to cheer,
Without window or door that would shut!
And a half clad mother her children cuddled,
To give warmth to the nestling brood;
And the little ones cried, as together they huddled,
"Oh, mother, pray give us some food!"

"O, ho! O, ho!" sighed old Jack Frost,
At a sight he loved not to see,
For paupers he saw,
Condemn'd by the law,
To feast upon skilligalee.
And he heard the poor wretches refused even that
By the flint-hearted overseer,
He believed not their tale, as cozy he sat,
Their heart-rending cases to hear.

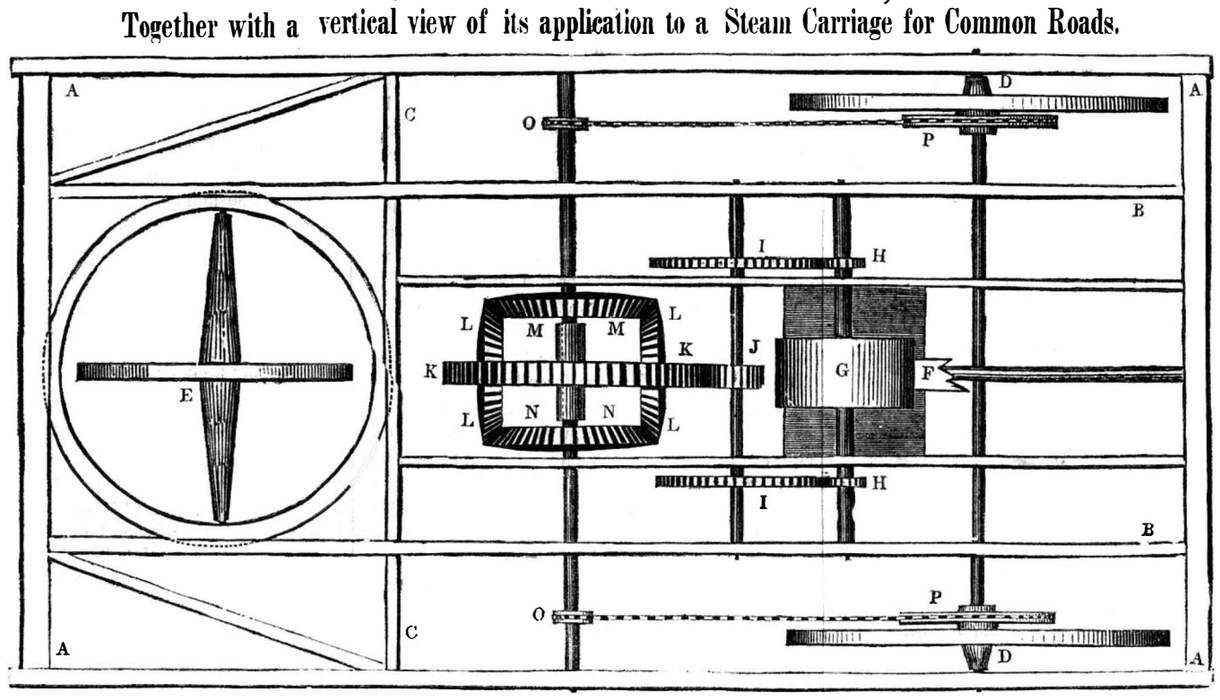
"O, ho! O, ho!" doled forth Jack Frost,
As he went far and wide through all parts;
"I came here to see,
Mirth comfort and glee,
Not to deaden and freeze up men's hearts,
I'll leave the world to the bright sun's beam,
Whose brilliance I laugh'd at before;
And may the gay warmth of its genial gleam,
Cause the rich to remember the poor."

A Word to the Sluggish.

Lose this day loitering—'twill be the same story
To-morrow, and next more dilatory;
Thus indecision brings its own delays,
And days are lost lamenting over days.
Are you in earnest? Seize this very minute,
What you can do, or think you can; begin it;
Boldness has genius, power and magic in it;
Only engage, and then the mind grows heated
Begin it, and the work will be completed.

EQUALIZING MACHINE,

Together with a vertical view of its application to a Steam Carriage for Common Roads.



INTRODUCTORY REMARKS.—Of the three greatest difficulties which have hitherto been encountered in the construction of steam carriages for ordinary travelling on common roads, and for agricultural service, the first is the excessive weight of the ordinary and only kind of steam-engines and boilers which have been in use. The second is the difficulty of adjusting the power to the occasion, so as to ascend hills with the same quantity of power that is required for level ground; and the third, the want of some method whereby the power can be equalized in its application to the driving wheels, so as to apply an equal force to each wheel, without regard to the relative motion thereof; or, to be more explicit, so as to apply as much force to the outside wheel while running on a curve, or turning a corner, as to the other or inside wheel, although the velocity of the latter in such cases, is much less than that of the former. With regard to the first difficulty, it will be conceded that we have evaded it in the introduction of the light, powerful, and perfect "Parallel Rotary" engine, which appeared in No. 3, and the Tubular Boiler, presented in No. 8 of this paper. With regard to the second and third difficulty it will be seen by the foregoing engraving, and the following explanation thereof, that one horse-power of steam, is sufficient to propel a four-horse-load up hill, and that an equal force will be applied to each wheel while running on sharp curves, as in case of turning the carriage to change its direction.

EXPLANATION.—The frame A, A, with the parallel beams B, B, and the cross-bar C, C, constitute the horizontal frame of the steam carriage, a side view of which appeared in No. 5 of this paper. The machinery which appears centrally in this view, is placed below the floor of the carriage, and does not appear in sight when in operation. The driving wheels, D, D, are mounted on separate axles, each extending from the side to the centre. The axle of the steering wheel, E, has its bearings in opposite sides of a horizontal circle which supports the forward part of the frame. The boiler, for obvious reasons, is not herein represented; but a section is shown of the steam-pipe F, by which the steam is conducted from the boiler to the rotary engine G, (the casing only of which is seen,) the shaft of which carries the pinions, H, H, which take to the geer-wheels, I, I, whereby motion is communicated by way of the centre pinion J, to the large central geer-wheel K, K. Within this wheel, between its axle and its rim, are mounted two bevel-geer wheels L, L. The axles of the large wheel, has its bearings on the ends of the axles of the bevel-geer wheels, M, N: but the axles of the first bevel-geer wheels, L, L, extend from the axle to the rim of the large wheel, having their bearings in each; so that the body of these wheels with their axles revolve round the axle of the large wheel; and as the teeth of these wheels take to the wheels M and N, the latter are put in motion by the former; and with them the small chain-wheels, O, O, from which, by means of two endless chains, the motion and power of the engine is communicated to other chain-wheels, P, P, whereby the driving wheels are put in motion. Now it will be seen, that if the bevel-geer wheel M is by any means retarded, it will not prevent the continuous application of power to the wheel N; and vice versa: wherefore, the application of force to both driving wheels is equalized, independently of their relative motion. It will moreover be seen, by those who understand multiplying geer-power, that if the engine is working under a pressure of 100 lbs., per square inch, and each float of the engine presents two square inches—making four inches for the two opposite,—the force applied to the endless chains, and through them to the driving wheels, will exceed *ten thousand pounds*. Consequently, but a small current of steam from the engine will be required, on level ground; but in ascending hills, the steam traveller will turn the valve and let on more steam; and although the velocity will be reduced, being limited by the quantity of the steam generated, yet the force applied to the wheels may be extended, as occasion requires, even to that of ten or twelve horses. We shall allude to this subject again, in our next number.

ORIGIN OF GLASS.—In the neighborhood of St. Jean d'Acre I passed the river Belus, and here it may be remarked, how often do we find from the most trivial circumstances, discoveries have arisen of the verry highest importance. Some sidonian merchants carrying nitre, happened to stop at the bottom of the stream, and not finding stones to set their kettles on to cook provisions, piled up sand and nitre for this purpose, when, by the action of fire on these ingredients, a new substance was discovered, namely, glass, which has added so much, not only to the comforts of life, but the progress of science. The sand of this stream continued for ages to supply the manufactories of Sidon with materials for that beautiful production; and in the seventeenth century vessels were employed at St. Jean d'Aere, to remove it to the glass-houses of Vinice and Genoa. It may be added, that, under the Emperors, windows were constructed of a certain transparent stone, called *tapis specularis*, found in Carmel, which is close to Belus, and might be split into thin leaves like slate, but not above five feet in length.

PRESSURE OF THE SEA.—If a piece of wood which floats on the water be forced down to a great depth in the sea, the pressure of the surrounding liquid will be forced into the pores of the wood, and so increase its weight that it will no longer be capable of floating or rising to the surface. Hence the timber of ships, which have foundered in the deep part of the ocean, never rise again to the surface, like those which have sunk near the shore. A diver may with impunity, plunge to certain depths of the sea; but there is a limit beyond which he cannot live under the pressure to which he is subject.—For the same reason it is probable that there is a depth beyond which the fishes cannot live. They have according to Joslin been caught in a depth, at which they must have sustained a pressure of eighty tons to each square foot of the surface of their bodies.

THE EARTH.—The surface of the earth is 196,862,266 square miles, and its solidity 257,726,934,416 cubic miles. Not more than one-fifth of the whole earth is habitable by man. The mean depth of the ocean is about three miles, and the mean height of mountains above the level of the ocean is one and three-fourth miles. Distribute this land over the bottom of the ocean, and the waters would cover the whole face of the earth. The mean annual temperature of the earth is fifty degrees.

IRON BUSINESS IN WAREHAM.—The Sandwich (Mass.) Observer contains an interesting statement of the amount of iron manufactured in Wareham. It seems that there are four large iron manufactories now in operation, and that a fifth is to be established. These four factories are capable of manufacturing about 20,000 tons a year of scrap iron into various articles. This, at $70 a ton, will amount to no less than $1,408,000 per annum. They consume about 10,000 tons of coal, and give employment to about 475 hands. Beside these establishments for working iron, there is a furnace in operation for casting hollow ware, and other articles, which turns out yearly about 600 tons of castings, valued at $15,000. There are about 150 nail tools at work, turning out annually 4000 tons of nails, worth $360,000.

A LONG RAILWAY.—The longest line of railway ever completed in Europe, is that from St. Petersburg to Odessa, extending over an uninterrupted line of one thousand six hundred miles. It will connect the Baltic and the Black, and consequently the Caspian seas—traversing three different zones of temperature; and a person may thus leave the Russian capital in the depth of winter, and arrive, on the same railroad, at Odessa, in warm, nay, hot weather. It is, however, the beginning of what may really be termed an overland route, connecting, in fine, the Russian metropolis and Ispahan. The Emperor Nicholas takes great interest in this gigantic plan.

A BEAUTIFUL IDEA.—That was a beautiful idea of the wife of an Irish schoolmaster, who, whilst poor himself, had given gratuitous instruction to poor scholars, but when increased in worldly goods began to think that he could not afford to give his service for nothing: 'Oh, James, don't say the like o' that,' said the gentle-hearted woman—'don't; a poor scholar never comes into the house that I didn't feel as *if he brought fresh air from heaven with him*—never miss the bit I give them—my heart warms to the soft, homely sound of their bare feet on the floor, and the door almost open itself to let them in."

RATHER BITING.—The French officer who gave the following toast recently, at Washington, was quite savage upon 'de grand leetle republique,' unintentionally:—'Gentilhommes! I shall give you one sentiment: it is dis: Amerique! de grand leetle republique vat is jist begin to devil-up itself.'

COMETS.—The work of Humboldt, now publishing, speaks of comets as 'an innumerable host.' When we estimate the length of their relative orbits, the boundaries of their perihelia and the great likelihood of their remaining invisible to the inhabitants of the earth by the rules of probabilities, we find they must amount to such myriads as make the imagination pause amazed. Kepler says there are more comets in the depth of space, than there are fishes in the bosom of the oeean, and yet the comet of 1811 requires 3065, and that of 1680 requires 8,800 years for their revolution; the first receding 21 and the second 44 times further from the Sun than Uranus, or 8,400 and 17,600 millions of miles!

POETRY.—Verily, this is an age of poetry. No one now a days thinks of expressing his thoughts in prose. It is altogether too cold and sober. The life and fire are wanted. A thorough-going teetotaller—just pledged, though black as two o'clock at night—thus expresses himself on the subject of rum selling:

"I'd sooner black my visage o'er,
And put de shine on boots and shoes,
Than stand within the grog-shop door,
And rinse the glasses drunkard's use."

CLOSE SHAVING.—A justice of the peace was called on for the payment of a bill of 75 cents. Upon presenting the bill, the squire asked him if he would swear to the account. The man replied yes. The squire swore him, and handed him fifty cents. 'Stop, squire,' said the man, 'you are mistaken in the amount; 'tis 75 cents.' 'I know,' returned the squire, 'but I can't swear you for nothing.'

A LAWYER'S OPINION OF LAW.—A learned judge being once asked how he would act if a man owed him ten pounds and refused to pay him. 'Rather than bring an action,' said he, 'with its cost and uncertainty, I would give him a receipt in full for all demands," and after a little rumination he added—'aye, and I would send him moreover, five pounds to cover all possible costs.'

DAMAGES FOR INFRINGING A PATENT.—In the U. S. Circuit Court, at Boston, on the 7th inst., in the case of Wm. C. Davol, of this town, against Brown, of Pawtucket, and others, for imitating the plaintiff's patent feeder in a cotton machine, the jury returned a verdict for the plaintiff—damages $950.

CATALOGUE OF AMERICAN PATENTS ISSUED IN 1844.

(Continued from No. 12.)

CLASS XVIII.—*Arts, Polite. Fine and Ornamental: inccluding music, painting, sculpture, engravings, books, paper, printing, binding, jewelry, etc.*

Block-letters, Lewis Katen, New York: Sept. 20.
Inking rollers, R. M. Hoe, New York, April 17.
Manifold letter writers, Jesse K. Park, New York: Nov. 13.
Marking and lettering packages, Wm. Francis and Wm. Johnson, Wayesville, N.C.: Oct. 3.
Piano-forte, Obed M. Coleman, Philadelphia: April 17; Lovering Ricketts, Baltimore: June 24; Ottoviano Gori & Philip Ernst, N York: March 26.
Turning-pins for pianoforte, J. Shaler Ives, Bristol, Ct.: January 6.
Printing press, Richard M. Hoe, New York: April 17; Alonzo Gilman, Troy: August 23: Seth Adams, Boston: Sept. 27.
Printing in colors, Thomas F. Adams, Philadelphia, Sept. 17.
Stereotyping, Clement Davidson, Saratoga, N.Y.:

CLASS XIX.—*Fire-arms, and implements of war, and parts thereof, including the manufactnre of shot and gunpowder.*

Constructing large guns, William F. Loper, Philadelphia: July 30.
Fire-arms, William Hubbell, Philadelphia: July 1: Edward Savage and Simeon North, Middletown, Ct.: Nov. 11.
Locks for fire-arms, Ethan Allen, Norwich, Ct.: Aug. 3.

CLASS XX.—*Surgical and medical instruments, including trusses, dental instruments, bathing instruments, etc.*

Apparatus for vapor baths, A. C. Haynes, Plattsburg, N.J.: Dec. 4.
Corslets for curved spines, &c., Alanson Abbey, Roxbury, Mass.: Aug. 7.
Cupping instruments, Robert J. Dodd, Philadelphia: April 13.
Apparatus for fractures, Livingston Roe, White Plains, N.Y.: November 6; Lewis Post, Lodi, N. Y.: Dec. 16.
Chairs for invalids, James G. Holmes, Charleston, S.C.: Sept. 24.
Nursing bottle, Eugene Dupuy, N York: April 30.
Stays for supporting the spine, Lyman Whiton, Troy: Oct. 12.
Setting artificial teeth, J. S. Dodge, New York: March 13.
Truss, David Sabin, Lancaster, Pa.: March 20; Epenetus Bennett, New York: April 30; Carter and Reinhardt, Baltimore, Md.: Sept. 24; Eliakim C. Darling, New Orleans: Nov. 6; Calvin Cuiter, Springfield, Mass.: Dec. 16.
Instrumenrs for uterine injections, Dan Gale, Boston: Oct. 16.

CLASS XXI.—*Wearing apparel, articles for the toilet etc., including instruments for manufacturing.*

Fitting ladies dresses, S. Richardson, Baldwin, Me.; April 4.
Hooks and eyes, E. C. Savage, Hartford, Conn.: March 26.
Suspender buckles, Henry Dubosq, Philadelphia, April 25.
Tailors' measures, Henry Isham, Montpelier, Vt.: May 30; John B. Combs, Trenton, N. J.: Nov. 9.

CLASS XXII.—*Miscellaneous.*

Improvement in awnings, John Sebo, Wilmington, Del., May 25.
Cutting india rubber, H.G. Tyer and John Helm, New Brunswick, N. J., Oct. 9.
India rubber fabrics, Charles Goodyear, New York: March 9.
India rubber goods, corrugated and shurred, Horace Eay, Jersey City, N. J., Oct. 12.

Improvements added to original patents granted during the year 1844.

Breaking and screening coal, Joseph Battin, Philadelphia: patented Oct. 6, 1843: improved January 20, 1844.
Hydrostatic weighted steam valve, William Duff, Baltimore, July 28, 1843: Nov. 26, 1844.
Plane Stock, William Foster, Washington: Nov. 24, 1843: March 16, 1844.
Oil boxes for railroad cars, John H. Tims, Newark, N. J.: Oct. 31, 1839: re-issued June 13, 1844: July 1, 1844.
Stoves, Daniel Williams, Troy: Feb. 3, 1836: re-issued Nov. 21, 1840: March 26, 1844.

A BALD EAGLE.—An eagle of immense size and power was killed lately in Montgomery, Ala. Geese, pigs, kids, and even sheep, were his common prey, but it was not until he attempted to carry off a negro child that the effort was made to kill him, which resulted successfully. So terrified, indeed were the neighbors, that a reward of fifty dollars was offered to any one who would take him. The weight of the eagle is put down at sixty-seven pounds, and he is said to have measured eight feet three inches from one point of the wing to the other.

TO REMOVE SPOTS OF GREASE FROM WOOLEN CLOTH, SILK, COTTON, OR LINEN.—Take an ounce of pipe clay, grind it with twelve drops of spirits of wine. When dry, the composition must be brushed off, when the stains will disapper: or rub a little magnesia moistened upon the spot, and rub it well off; or cover the spot with French chalk, apply an iron warmed, to melt the grease, when the French chalk will absorb it, and it may all be brushed off together. For silk or cotton dresses, grate raw potatoes into water, so as to form a pulp, pass the liquid through a sieve and let the potato subside. Pour the clear liquor from the top, which may be bottled for use. Dip a sponge and wet the spot till it disappears, then wash it in clear water.

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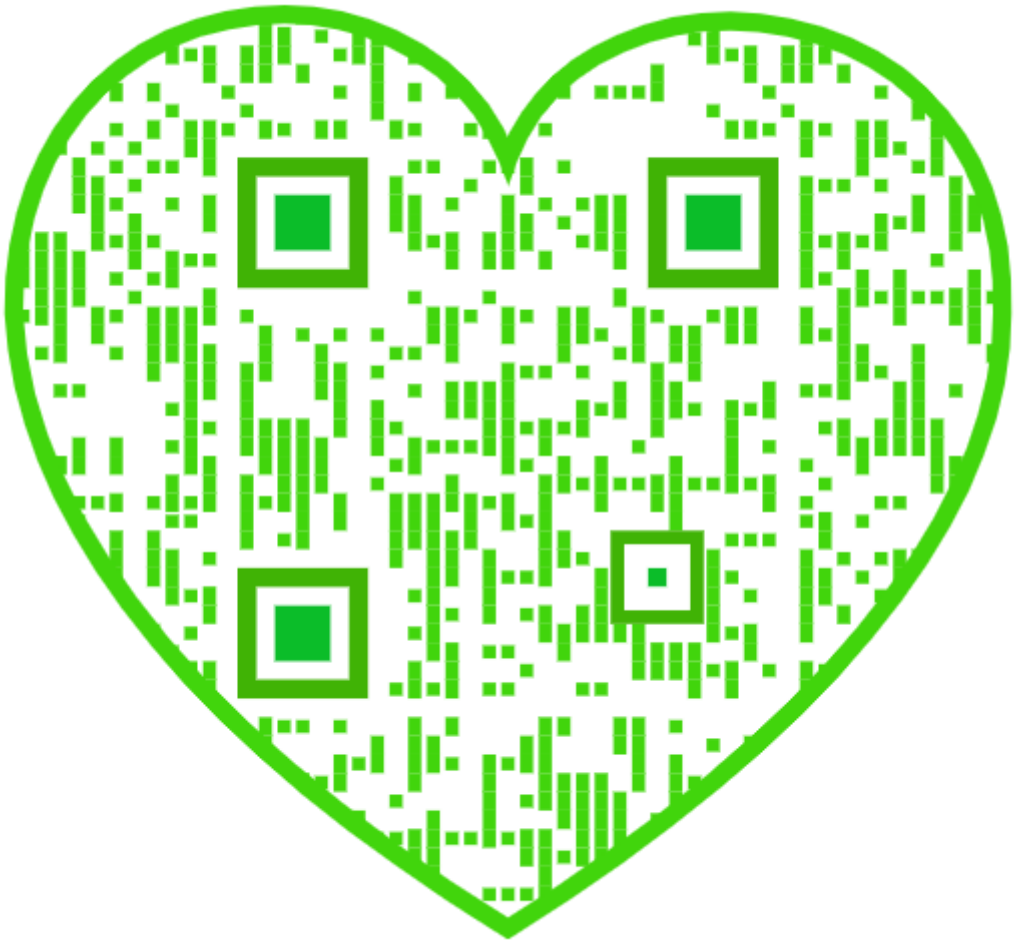
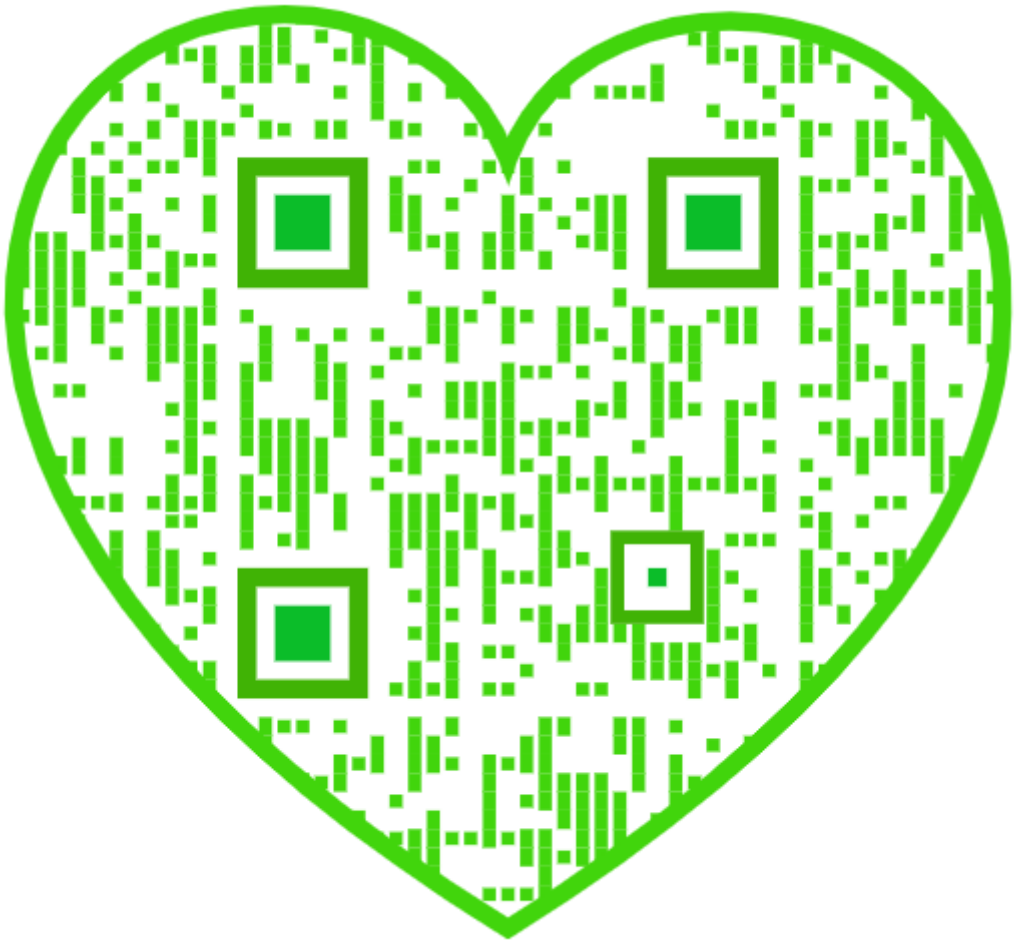




SCIENTIFIC AMERICAN

NEW-YORK, THURSDAY, DECEMBER 11.

To Correspondents.

The communication of E. J. P., of Philadelphia, is received, and will find a place in our next number, with an outline engraving. P. A. M. of Baltimore, need not be afraid of having the right of his "Perpetual motion" pirated;—his plan being one that has often been tried before, and as often proved to be destitute of all 'moving principle.' Mr. Hiram Ayres, having omitted to give his P. O. address, is requested to write again.

Clinton should have given his proper name, even if he does not wish to have it inserted.

P. V. S. Washington, with drawing will receive due attention.

Also that of J. E., of Buksport, Me.

FREE PAPERS.—Inventors and others, nonsubscribers, to whom we may send copies of this paper are respectfully solicited to become subscribers, and to introduce the paper to others, where it may have a chance to tell its own story.

Post Masters who receive copies, are requested to display them, and dispose of them to any persons who will pay the postage thereon.

Condensation of Steam.

We understand says the Louisville Journal, that some of our manufacturers who use steam-power, are endeavouring to ascertain by experiment, whether they cannot, without much expense, condense nearly all their steam, so that, by the use of a large cistern, they can be abundantly supplied with soft water for their engines. The condensation is expected to be produced by simply passing the steam through horizontal pipes which will thus be cooled by the action of the air. There is a common prejudice among engineers, which, we apprehend, is not based upon either scientific principles or actual experiment, that, if steam is propelled through long pipes, the reaction upon the engine is so great as to materially reduce its power. Some of our manufacturers have employed their surplus steam for the purpose of warming their edifices in winter, by sending it through horizontal iron pipes, in the course of which much of the steam is condensed, while there is no perceptible effect on the engines. All the extra labor which the engines have to perform is to propel a column of steam through an open pipe under no pressure.

If this plan succeeds, it will be very valuable.—The only loss of steam will be that which escapes through the engines and boilers, which is generally a very small proportion; so that those factories which use large engines as well as those which use small ones, can be fully supplied with water from their rain water cisterns. The well water now generally used causes a deposite of carbonate of lime upon the boilers, which occasions two important difficulties, requiring more fuel in the production of steam and causing the boilers to burn out sooner than they would with rain water. The use of river water though better than well water, is objectionable on account of the deposites of mud in the boilers, so as to require frequent cleaning out. If rain water were used, no cleaning out would be required, and the water is at all times exposed most advantageously to the fire, without any intervention of mud and lime.

We can assure the editor of the Journal, and with him the said experimentors, that no experiment should be necessary to establish so simple a point as that under consideration. According to the most plain and simple laws of nature, if the steam escapes from the engine into a *sufficient length of pipe*, the steam will not only become instantly condensed, but will produce a vacuum which will facilitate the working of the engine.

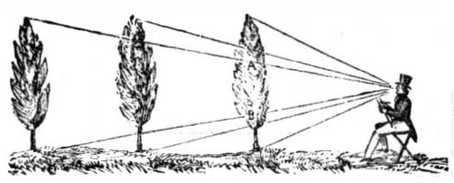
MANUFACTURING ENTERPRISE.—A prevailng confidence in the permanency of our present judicous tariff laws, has induced in the central part of New England, a degree of enterprise in the manufacturing line, beyond all precedent. The new mammoth mill at Portsmouth, with 50,000 spindles, will soon be finished: another at Salem with 40,000. Two new mills at Newburyport are in progress, and run will 21,000 spindles and 541 looms. At Manchester two or three new mills of the largest class are being erected, also one at Nashua. At Lowell, the Merrimack Manufacturing Company are putting up two large mills one of them 400 feet long, and the other 300,—for cotton goods, and another for woolens: and are about to erect another for the carpet manufacture, which will run 250 looms for ingrain, and 50 for Brussels carpets. At Dover the Calico Co. are erecting the largest calico printing manufactory in the country. We rejoice to see this enterprise, and the "progress of improvement" well knowing that the value of real estate in general through an extensive section of country will be enhanced, and that all classes of the community will be benefitted thereby. To the opponents of this enterprise, who are predicting that the manufacturing business will produce the same degradation of society in this country, that exists in the manufacturing districts of Europe, we would say, just wait a little till all our uncultivated land is taken up, and densely populated—then we will hear you on the subject.

THE PRAIRIE STEAM CAR.—We should have acknowledged, ere this, the receipt of a pamphlet from Gen. James Semple of Alton, Ill., in which is presented an account of a series of experiments on the practicability of navigating the western prairies by steam power, independently of railroads. Also a chain of rational arguments, calculated to illustrate the utility as well as the feasibility of the project. We have spoken descriptively of this enterprise before, and expressed our conviction of its practicability; and are happy to learn that a company is formed, with capital sufficient to put machines of this kind into successful operation on a scale of practical utility. There can be no doubt of the ultimate success of the enterprise.

The art of Painting.

(Continued from No. 12.)

LANDSCAPE PAINTING.—We shall not, in this place, give the theoretic and systematic rules of perspective drawing, as usually taught in the schools, and which tends, invariably, to check, if not destroy a natural taste for drawing and painting; but arrange our instructions in such a manner that the learner will be amused with the task and encouraged to proceed. A complete apparatus for this art requires nothing less than all the different pigments and colors, and all the variety of paint brushes and pencils that are used or known; but as no artist has ever hitherto obtained or possessed an apparatus complete, we shall be content to commence with some very simple preparation. With a small quantity of each, of lamp black, prussian blue, venitian red, chrome yellow, and white lead, ground in oil, and two or three hair pencils, an artist will produce a very fair picture. These, and a great variety of other colors, may be found ready ground and put up in vials or tin-foil tubes, at the artists' finding-stores: but the amateur may readily grind and prepare them for himself; and may prepare either cotton cloth stretched and sized as described in No. 12, or paint on pieces of board, prepared by a ground coat of white, or light stone colored paint. It may be well for him to practise copying from other painted pictures, if such may be readily obtained; otherwise, he may copy from nature, selecting such views or objects as are most simple and easy of imitation. The outlines of the view or picture may be sketched first with a pencil, consisting of a pointed piece of chalk or charcoal, attached to the end of a small round stick, about ten inches long. With regard to *perspective* in drawing, the learner has only to observe the relative proportion and position which one object bears to another. For example: if three trees stand at different distances, the first being 20 feet, the second 40, and the third 60 feet from the artist, then the height of the first will appear double to that of the second, and equal to three of that of the third, as may be thus illustrated:



It is thus shewn that the height of the third tree appears to the eye only equal to the section A B of the second; and that although the three trees stand on a level, yet the artist, in drawing the representation of them, must place the foot of the third as high on the picture, as the point B on the first; so that a line drawn from the foot of the first to that of the third, will appear on a bold angle with the horizon. The practitioner who draws from nature will compare the apparent size of one object with that of another, that he may give each its proper apparent size on the picture.* In most cases, however, the principal grounds, such as the sky, clouds, water and land, are painted and allowed to dry, before the trees, buildings, and other particular objects are drawn. In coloring a picture, it is better to endeavor to imitate the natural appearance of natural objects, than to imitate the paintings of even celebrated artists. On this account it is not unfrequently the case, that the productions of self-taught artists, far surpass in excellence those of regular bred artists who have studied with the most popular Italian masters. The form and size of the principal subjects of a picture may generally be painted of a plain medium color at first, and afterwards brightened with a brighter color, in the direction of the supposed principal light, and shaded on the opposite side. In coloring distant lands, the lights and shades (or, as they are often termed, heightening and shading,) are applied immediately, and incorporated or blended with the medium ground-color before it is dry. But less distant objects, may be heightened and shaded to better advantage after the ground color is dry. Another important rule to be observed in this art, is that of coloring objects more or less bold in proportion to their distance. For example: two brick houses may appear in the view, one of them but a few rods, and the other a mile distant. When properly painted, an ordinary observer would not discover any difference in the coloring of the two: yet the artist well knows that the distant house has less than one-fourth of the depth of coloring, that is presented in the other. By a judicious application of this rule, in graduating the colors, as well as the size, of objects, the eye of the spectator is deceived, and he is led to believe that a part of the painted surface is absolutely farther distant from the eye than other parts.

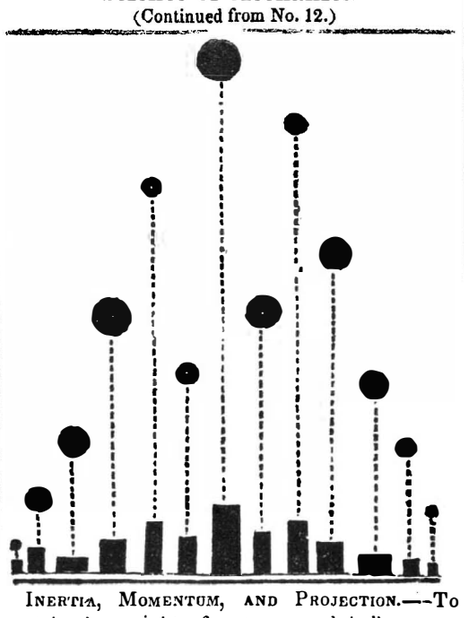
* Since writing the above we have received from Mr. James Emery, of Bucksport, Me., a description of an excellent, simple, and convenient invention, particularly calculated for ascertaining the relative proportion of different objects in drawing. We shall give a description with an engraving in our next.

To be continued.

THE OLD STONE TOWER.—We have received a lengthy communication on this subject, from a highly respectable old gentleman, resident of Newport, R. I., who adduces divers reasons for believing that the unaccountable old stone tower, described in No. 11, was built by Governor Benedict Arnold, a few years subsequent to the first settlement of the island by the English emigrants; and that it was built for a wind-mill. It is clearly enough proved that this building was owned by Governor Arnold, as he speaks of it in his 'will,' which is still extant, as 'my stone built mill;' by which it is evident either that he had used the building for a mill, or that he supposed it had been built for a mill by the aborigines. But after all, to suppose that a man capable of acting as governor of the colony, should have erected, for the purpose of a wind-mill—which of all buildings requires the most strength and firmness,—a stone building mounted on eight tall stone columns, would require a greater effort of faith than any other supposition that we have seen put forth on the subject. At any rate, being fond of the marvellous, we do not like to spoil a good story.

Science of Mechanics.

(Continued from No. 12.)



INERTIA, MOMENTUM, AND PROJECTION.—To sustain the weight of a ten pound ball, a verticle force of 10 lb. is required to counteract the force of gravity. If a force of 20lb. is exerted during one second of time, the ball will have moved over a space of 16 feet, and will have acquired a momentum sufficient to carry it 16 feet higher—in all, 32 feet. If double the force is exerted (in addition to that required to counteract gravity or thirty lb. in all,) to an equal vertical distance, the velocity will not be doubled, but the ball will be projected to the height of 32 feet in addition to the first 16, or 48 feet in all. If this double force is exerted during one second of time, the velocity of the ball will be doubled, and it will have passed a space of 32 feet, and will be projected to the height of 64 feet, or 96 feet in all.—If a force of 100 lb. is exerted on this ball, to a distance of 10;—or if a force of 1000 lb. be exerted to the distance of one foot, (the force to be always additional to the weight of the ball,) the ball will be projected at the height of 100 feet from the point at which the force leaves it.—A power sufficient to raise 100 lb. weight, 330 feet distance in one minnte, is termed a *horsepower*. This is equal to raising 33000 lb. one foot high in one minute; or to producing a velocity of 32 feet per second in 7,560 lb. weight: or to projecting a 10 lb. ball to the height of 3300 feet. In treating of the theory of projections, however, no allowance is made for atmospheric resistance: but that will be considered in a future number.

It has been before remarked that the exertion of 10 lbs. force on a 10 lb. ball, and continued for one second of time, would produce a velocity of 32 feet per second, if its direction be horizontal: but in all vertical projections upward, the force on which calculations of velocities is based, must be always additional to the weight of the body projected. The momentum of a moving body, can only be ascertained by the quantity of resistance requisite to overcome or balance it. The most convenient mode of ascertaining the quantity of momentum in moving bodies, is by the vertical distance which the said momentum will impel the said body in opposition to the resisting force of gravity. The momentum of a projected ball is in direct proportion to the force applied, multiplied by the distance of the application without regard to time. Thus if ten lb. force be exerted on a 40 lb. ball for the distance of 16 feet, the time occupied in the exertion would be one second: the velocity of the ball would be 32 feet per second, and its momentum would be sufficient to carry it 16 feet higher. If 20 lbs. force be applied to a 10 lb. ball, and the exertion continued 8 feet, the velocity will be 32 feet per second, and the momentum will impel it 16 feet higher. If 40 lb. force be exerted 4 feet; 80 lb. force 2 feet, or 160 lb. force 1 foot, the velocity and momentum will be the same. But if the 160 lb. force be continued 16 feet, the velocity will have been quadrupled, or equal to 128 feet per second; and the momentum of the ball will be 16 times as great as in the first instance, and will impel the ball to the height of 216 feet. If this force is continued one second of time, according to that of the first instance, the last momentum will have been quadrupled, and the ball will be impelled to the height of 864 feet. (In all of these examples, be it understood, that there is supposed to be an extra force applied equal to the weight of the ball, merely to counteract the force of gravity,) on the foregoing principle it may be calculated that in all vertical projections, the momentum, and consequent elevation of the ball, will be in proportion to the force applied, *and that* multiplied by the *distance* of the exertion, without regard to time: but the *velocity* produced, will be in proportion to the force multiplied by the *time* of the exertion, without regard to distance: and the additional momentum produced by additional impulse, will be as the square of the additional velocity. To ascertain the quantity of momentum that may be produced by a specific quantity of *power*, we have only to enquire what distance the given power would be able to raise the given weight. For if the given power, will raise 10 lb. weight a distance of ten feet in ten seconds, then we may conclude that if the same power were exerted in the time of one second, the force would be ten times as great; or that, if exerted in the tenth part of a second, the force would be a hundred times as great, or equal to 1000 lbs.; and that if exerted on a 1 lb. ball, it would produce a momentum sufficient to elevate the ball 100 feet: or, if the weight of the ball were only one-tenth of a lb., it would be projected to the height of 1000 feet.

The cut at the head of this article is intended to illustrate the relative extent of projections, produced by different degrees of force, and extent of exertion, as indicated by the different lengths and breadths of the vertical cylinders at the bottom.

To be continued.

A WORKING MAN.—It is reported that President Polk rises at break of day,—takes a walk before breakfast,—works till 12—gives audience till 2—and works after dinner till late at night.

Galvanism.

(Continued from No. 12.)

ELECTRO MOULDING.—We shall now proceed to describe some of the applications of Galvanism to the useful arts, the first of which is the art of *Electro Moulding*. One branch of this art is termed *electrotyping*, on account of its application to the copying of types, thus producing a substitute for stereotypes. The most delicate engraving on copper may be so perfectly copied by this process, that the impressions taken therefrom can not be distinguished from those taken from the original. The common plain copper and zinc-plate battery,—a single pair only—is used for this purpose. A font, consisting of a deep porcelain vessel, is placed at an indefinite distance from the battery, and nearly filled with a mixture of twenty parts of a saturated solution of sulphate of copper, ten parts of water and one part of sulphuric acid. Two copper wires being attached to the two poles of the battery extend to the font. In this case, the wire which extends from the copper or negative pole of the battery, is termed the *positive*, and the other the *negative* wire. The pattern, or engraved plate, is attached, by solder or otherwise, to the end of the negative wire, and another plate of plain copper, of about the same size, is attached to the positive wire, and both are immersed, vertically, and about two inches apart, in the liquid in the font. A galvanic action instantly commences, the plain or positive plate is gradually dissolved by the acid of the solution, while pure metalic copper is formed and deposited on the engraved plates. If the process is well managed, the deposite of copper will have acquired a thickness of 1-16th of an inch in twenty-four hours. The back and edges of the pattern, which are not intended to be coated with the copper, must be previously coated with wax or shellac varnish. The new plate of deposited copper may be easly taken off from the pattern, and having been washed with spirits of turpentine, or suffered to remain a few hours in the air, may be attached to the negative wire, and placed in the font, with a positive plate opposite, as before. This new plate is called the mould, being the reverse of the original engraving: but the plate formed by the deposition of copper on the face of this mould, will prove a fac similie of the original, and will answer every purpose thereof. By a similar process a form or page of common type, may be immersed in the mixture, a plate of copper being placed opposite as before mentioned, and a deposite will be produced on the on the face of the type—the other parts being insulated with wax,—and this deposite being used as a mould, a fac similie of the type will be produced, of good solid copper, which may be secured on a block in the manner of stereotypes, and will be four times as durable as type-metal. In preparing the form of type for this process, it is requisite to fill all the interstices between the types, with fresh mixed sulphate of lime (plaster of Paris) which, when dry, must be brushed over with fine plumbago. Metals, dials, door-plates, and many other useful and ornamental articles, brilliant and elegant, may be easily produced in any quantity, by this electro-process, and equal in all points to the engraved, chased, or otherwise ornamented plates, which are used as patterns in this process. Any of these articles may be produced already plated with either gold or silver, by a process which we shall describe in another number. It may be here remarked, that the mixture in the font, may be kept in use for a long time, being constantly replenished by the solution of the negative plate: but that the saline solution in the battery, especially the sulphate of soda, require to be renewed daily, while in operation. The other solution,—the sulphate of copper, must be kept saturated by having a small quantity of the salt (blue vitriol) enclosed in a piece of muslin and suspended in the solution.

To be continued.

Mechanical Movement.

This is called the Universal Joint, and is frequently employed as a coupling to connect different shafts or arbors which extend in different directions. Each shaft terminates in two branches, which are connected to two opposite arms of an intervening four-armed cross: each arm terminating in a pivot, which is inserted in one of the branches, of the shafts. It will be readily seen that by this arrangement, the motion of one shaft will be communicated to the other, even if the two shafts vary in direction forty-five degrees. Each shaft should have a bearing as nearly as possible to the joint. There is less friction occasioned by this universal joint, than by pinions, and it might be employed with advantage in many places where bevel-gear pinions are now used.

AN INTERESTING ESTABLISHMENT.—There is seldom found in this, or any other country, a more perfect specimen of true mechanical enterprise, than in the establishment of Mr. D. L. Farnum, No. 29 Fulton street. It is obviously the intention of the worthy proprietor, to benefit the public as well as himself; and with this view he has diligently examined nearly every mechanical apparatus in general use, and having ascertained where improvement is most needed, aims to remedy the defects, and manufacture such articles of machinery, &c., as will the most effectually accommodate the public with regard to both convenience and elegance. For further particulars we would refer our readers to the advertisement under the representation of an elegant *fountain*, in another column.

AN OLD FIDDLE.—An old black looking violin, unstrung and rusty, had for some time been lying at a second-hand shop in Chatham street, until recently, when one of our first-rate musicians enquired the price of it, and was answered 'twenty dollars.' Probably if the price had been only twenty shillings, he would have left it untouched: but $20 for an old damaged fiddle, excited his curiosity, and having put it in order, it proved a very superior instrument. He has been offered $150 for it, but refuses to sell it for less than $300.

VARIETY

There are fifteen hundred and fifty five newspapers and periodicals in the United States, and but eighteen hundred and ninety-one in all the world elsewhere.

An Italian who was very poor, but much addicted to gambling, used to remark to the fickle goddess, Fortune, "Thou canst make me lose, but thou canst not *make me pay*."

J. Sherwood of Jamestown, North Carolina, has issued proposals for publishing a paper, adverse to the system of slavery. He must look out sharp for Judge Lynch.

A London correspondent of the Boston Atlas says he went in the railroad cars from Liverpool to London, *two hundred and ten miles*, in six hours and a quarter.

The packet ship Saranac recently sailed from Philadelphia for Liverpool, with a cargo consisting in part of 2,526 barrels of flour, and 16,00 bushels of wheat.

A correspondent of the Hartford Herald says that four-fifths of the *religious* newspapers, which have been started within the last twenty years, have failed for want of patronage.

Sir John Herschel expresses the opinion that the most effectual preventive from vice, by keeping men away from alehouses and taverns, is an interesting newspaper to read at home.

By a late report of the Eastern Penitentiary, it appears that of 1916 prisoners, 1289 were unmarried Who will advocate old bachelorism after this?

It is stated by a respectable French writer, that the house of Rothschild has cleared, within the last year, a nett profit of 120,000,000 francs—about *twenty-five millions of dollars!*

A poor inebriate having come to his death by intemperance, in a small village in Maine, four rumsellers were selected as bearers to carry him to the grave. Very appropriate.

It is reported that certain bakers of this city make their bread so excessively light, that the weight of a heavy driver is required to hold the carts down when loaded with it.

A Scotch farmer in Addison county, Vermont, has made seven thousand pounds of butter, the past season, which he sold at the highest price in the Boston market.

James Clark, the new Governor of Iowa, worked several years at Harrisburg, as a journeyman printer. Some journeymen printers have no prospect of being Governor.

The Prince de Joinville is daily becoming more popular in France. There is a strong probability of his taking a conspicuous part in European affairs before many years.

An absquatulator having occasion to evacuate his premises between two days, contrived to get two or three days ahead of his creditors, by putting crape on the shop door.

A splendid bible has been presented to Ole Bull, by the Home Missionary Society of Philadelphia as a testimony of approbation of his fiddling——in aid of the poor.

Somebody compares the influence of a certain polical paper over the public mind, to that of a bobtailed horse over a nation of flies in July.

The steamship Cambria arrived at Boston on Thursday last, after a passage of fifteen days. She brought no news of much importance to any class.

The state-prisons of Rome are said to be filled with 7000 prisoners, many of them of the first families. The disaffections of the people there are not yet settled.

Gay colored articles of dress, are going out of fashion in Europe. This will make it bad for those ladies who have paid enormous prices for dashing red scarfs an shawls.

The clerk of the House of Representatives at Washington lately sent an order to Baltimore for 200 sets of engravings, and received a satisfactory answer in the short space of thirteen minutes.

The reading columns of most of our exchange papers, having been monopolized by the President's Message, there is an unusual scarcity of news in the market.

So great is the commercial demand for coal at Pottsville, Pa., that many of the miners find it difficult to procure a comfortable supply for their families.

The celebrated rowdy boxer, Ben Caunt, has accepted a challenge from Bendigo, to fight for £1000 a side, and the championship of England. It is to be hoped that they may prove equally matched.

There is a silver mine in Mexico, which has been excavated about eight miles in length, and is over sixteen hundred feet in depth.

The Boston Bee says it is questionable whether any man, who was in the habit of advertising liberally, ever became bankrupt.

Prentiss, of the Louisville Journal is accused of abolitionism,—having recently declared that all men, of whatever color, *ought to be free.*

The city councils of Richmond, Va., have decided that Locomotives are preferable to horse-power for propelling railroad trains through that city.

One hundred ladies in Washington have subscribed $5 each, to be expended in the purchase of wood to be distributed amongst the poor during the winter.

John B. Gough has so far recovered his health as to have given a lecture at Faneuil Hall, Boston, which was received with rounds of applause.

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Labor.

BY MRS. FRANCES S. OSGOOD.

Pause not to dream of the future before us;
Pause not to weep the wild cares that come o'er us;
Hark, how Creation's deep, musical chorus
Unintermitting, goes up into Heaven!
Never the ocean wave falters in flowing;
Never the little seed stops its growing;
More and more richly the Rose-heart keeps glowing,
Till from its nourishing stem it is riven.

"Labor is worship!" the robin is singing;
"Labor is worship!"—the wild bee is ringing.
Listen that eloquent whisper upspringing
Speaks to my soul from out nature's great heart.
From the dark clouds flows the life-giving shower;
From the rough sod blows the soft breathing flower;
From the small insect, the rich coral bower;
Only man, in the plan, shrinks from his part.

Labor is life!—'Tis the still water falleth;
Idleness ever despaireth, bewaileth;
Keep the watch wound, for the dark rust assaileth!
Flowers droop and die in the stillness of noon,
Labor is glory! the flying cloud lightens;
Only the waving wing changes and brightens;
Idle hearts only the dark future frightens;
Play the sweet keys, wouldst thou keep them intune.

Labor is rest from the sorrows that greet us;
Rest from all petty vexations that meet us,
Rest from sin-promptings that ever entreat us,
Rest from world-syrens that lure us to ill.
Work—and pure slumbers shall wait on thy pillow;
Work—thou shalt ride over Care's coming billow;
Lie not down wearied 'neath Woe's weeping willow;
Work with a stout heart and resolute will.

Droop not tho' shame, sin, and anguish are round thee;
Bravely fling off the cold chain that hath bound thee;
Look to yon pure Heaven smiling beyond thee.
Rest not content in thy darkness—a clod.
Work—for some good, be it ever so lowly;
Cherish some flower,—be it ever so lowly;
Labor! All labor is noble and holy;
Let worthy deeds be thy prayer to thy God.

School Exhibition.

TUNE—"*Dan Tucker.*"

We greet with joy this happy day,
And we will drive dull care away;
Hearts full of cheer, we'll never fear
While we in wisdom's ways appear.

CHORUS.—Then shout aloud! swell the chorus,
Happy days are yet before us.

O, we will love our happy school,
And never play the idle fool;
United all in heart and hand,
O, are we not a happy band?

Chorus.—Then shout, &c.

From morn till noon, from noon till night,
Let peace and love our hearts unite;
And when our daily task is o'er
We'll sing the song we sung before.

Then shout, &c.

We bless the land that gave us birth,
The dearest spot of all the earth;
New York it is our glorious home,
And we will never wish to roam.

Then shout, &c.

Here Freedom's star is rising high,
It shines in splendor from the sky;
Its beams shall light the bondman's cot.
And pierce the darkness of his lot.

Then shout, &c.

Here Science fair and Learning bright,
Shall shed a pure and holy light;
And Knowledge, Truth and Liberty
Our watchwords ever more shall be.

Then shout, &c.

MARRIAGE NOTICE EXTRAORDINARY.—In Worcester, Mass., on Thursday, Oct. 9, Tallaferro P. Shaffner, Esq., Attorney and Counsellor at Law, of Louisville, Ky., Past Grand H. Priest and Grand Patriarch of that State, a Grand Representative to the Grand Lodge of the United States from the Grand Encampment of Kentucky, Junior Editor of the 'Covenant,' of Baltimore, ex-Editor of the 'Free-Mason, of Louisville, Corresponding and Recording Secretary and Librarian of the Kentucky Historical Society, Recording Secretary of the Board of Missions of the Methodist Episcopal Church, South, Captain of the 1st Company, 123d Regiment, 29th Brigade of Kentucky Militia, &c., to Miss Nancy R. Pratt, of the former place.

GRIEVOUS DISAPPOINTMENT.—The sheriff of Stafford Co., N. H., prepared a gallows last week, for the purpose of hanging Andrew Howard, and 10,000 people had assembled to see the sport; but just before the hour appointed for the execution, the Governor arrived with a reprieve. The people were very indignant at such interference, but as none of them could manage to hang the man, they returned grumbling and staggering to their homes.

MORE SHOP-LIFTING.—The large four-story brick block of stores at the corner of Washington and Elliot streets, Boston, are being raised several feet from their present foundation. The block is upward of 100 feet high and 50 feet deep.

NEWSPAPER OFFICES BURNT.—The offices of the Gazette and Advertiser were destroyed by fire on the 18th ult., at Chilicothe, Ohio. We can sympatise with the publishers, although we have not learned the extent of their loss.

OUR NEXT NUMBER.—Will contain a variety of interesting articles, with illustrations, among which will appear a large engraving representing a plan for transporting ships through the country by railroads.

Communication.

(Continued from No. 7.)

PATENT OFFICE, WASHINGTON, Dec. 6.

MY DEAR SIR,—In my last, I believe I left off on Railroads—showing the advantage of travelling by having two or more setts of driving wheels connected together and driven by one engine, so as to create much more friction on track, and thereby enable one locomotive to propel a greater load at the same rapidity, &c. While the travelling by railroads has been improved by the above mode, it has nevertheless been much improved by steam landcarriage, by Mr. James Semple of Alton, Illinois, who has adapted the locomotive engine to what he calls the Prairie Car—viz., making the propelling car, which carries the engine, &c., very large, so as to have the wheels, or hollow cylinders, 6 feet in diameter by 5 feet tread; and two or more pairs of propelling wheels, or cylinders, as may be deemed necessary. The diameter and width of the tread of the propelling wheels help them to keep from sinking deep in the mud or earth on prairie lands. A steam carriage thus constructed, it is supposed, will carry heavy loads over level roads at the rate of 12 to 20 miles per hour.

The conversion of wood into stone for railroad purposes, is something that would be of vast benefit to the western States and Territories, could it be made durable and not subject to rot or decay. A process for the conversion of wood into iron and stone, for railroads, has been very successfully tried in England. Should the experiment thus tried bear the test, it will be of immense value to this country, in the construction of railroads. Some of this metalized, or fossilized wood, has been used in constructing the terminus of the Dover Railway, in England, which seems, by the account given of it by Professor Wright, of London, to have both the properties of stone and iron. Rails of it being laid down for experiment, at Vauxhall, endured a travel equal to that of a year on the most thronged railway, without any perceptible wear—not even the saw marks of the timber being removed. It is supposed that timber thus prepared, and to endure such wear, would not be subject to rot or decay of any kind. This, time will tell. The process of thus preparing timber is simply this: the pieces, after having been fitted by the carpenter or joiner for their places, are introduced into an immense iron cylinder, which is then exhausted by an air pump. A solution of the sulphate of iron is then injected, which immediately enters into the exhausted pores of the wood; the wood is then withdrawn, and again put in a similar vacuum, in a solution of muriate of lime, which, coming into contact with the sulphate of iron within the wood, decomposes it, and forms an insoluble sulphate of lime, or gypsum, within the wood; and the muriate of iron, the other new compound is left at liberty—so the wood becomes thoroughly impregnated with stone as hard as a rock, and yet is as tough as it was before. The expense is but trifling compared with the durability; it is said not to exceed four hundred dollars per mile, for thus preparing timber.

Permit me to call the attention of Engineers to the different kinds of Coals used for fuel in steam navigation—such as the Anthracite, Natural Coke, Bituminous, &c. The principal object is their evaporative power, under given bulks. This is obviously true, since, other things being equal, the length of a voyage must depend on the amount of evaporative power afforded by the fuel, which can be stowed in the bunkers of a steamer, or the tender to a locomotive—which are always of a limited capacity. Of the American coals, I will name a few of the best, such as have been tested by the Navy Department, viz.: Atkinson & Templeman's, Beaver Meadow, Slope No. 5, Peach Mountain, Forest Improvement, Easby's, New York and Maryland—there being upwards of 40 different kinds tried.

The numerous certificates and declarations which either in the form of reports or other published articles, have from time to time been put forth in regard to certain coals, may in some instances be entitled to consideration, as evidences of their superior worth; in others, of a commendable industry and energy on the part of the proprietors; while other kinds, the merits of which have not been the most loudly proclaimed, may, upon due examination, be found among the most estimable and the most enduring. It will not fail to be remarked that the justly celebrated foreign bituminous coals of Newcastle, Liverpool, Scotland, Pictou and Sidney—which constitute the present reliance of the great lines of Atlantic steamers—are fully equalled, or rather surpassed in strength, by the analogous coals of eastern Virginia; that they are decidedly surpassed by all the free-burning coals of Maryland and Pennsylvania; and that an equally decided advantage in steam-generating power is possessed by the Anthracites over the foreign coals tried, whether considered under equal weights or equal bulks.

Experiment appears to demonstrate that, for the purposes of rapid evaporation, and for the production of illuminating gas, the coal of Indiana, though neither very heavy nor very durable, is inferior to none of the highly bituminous class to which it belongs; since the heating power, and freedom from impurity, being requisite, it surpasses the Splint and Cannel coals of Scotland. One of the important points, in regard to coals, is to investigate the proportion of sulphur. This requires labor and time. Another point of practical importance is the composition of the earthy matter, or ashes of each coal. To understand the relative strength and usefulness of the coals from different parts, or different coal regions, requires that they be examined with great care and attention.

The surprising extension of steam navigation on the western rivers, and the northwestern lakes, as well as the Gulf of Mexico and the adjacent seas, the increase of population, and the consequent clearing of woodlands, all point significantly to a necessity, which must be felt at no distant day, to have recourse to mineral fuel, for supplying this rapidly increased demand. Under this consideration, may be be seen the importance of investigation, with regard to the qualities as well as quantity of he coal mines of the United States. W.H.W.

Capital Punishment.

On this subject we find in a late number of the 'True Wesleyan,' the following extraordinary argument: 'Do we overcome evil with good when we shut a man up for life, more than when we hang him? Much is said about hanging being opposed to the spirit of Christianity, but does the spirit of Christianity justify imprisonment? The question with us is not, Which is the greatest outrage upon Christianity? but is there any outrage upon Christianity in either or both. If there is in the one there is in the other, and both should be abandoned.'

We would not directly accuse the writer of such argument, with outraging common sense; but we can not possibly see the least propriety in the position, that to confine an evil disposed person, for the purpose of restraining him from the commission of crime, is as much at variance with Christian principles, as to hang him up, vindictively, by the neck, and violently send him to 'the world of spirits,' whether he is prepared to go or not. Tne very persons who most strenuously contend for capital punishment, are among those who profess to believe that every man goes directly into eternal bliss or eternal misery, as soon as the soul is separated from the body. Now let them consider either alternative—if the victim *is* prepared for eternal happiness, he would of course be a good citizen here, and there would be no excuse or plea for killing him, except *revenge* for his past conduct: and even this would be an absurdity, inasmuch as the act, instead of being a punishment, would prove the greatest possible benefit. On the other hand, if the culprit is *not* prepared for salvation, we would ask any one of those *christian* gallows advocates, whether he would deliberately drive a fellow being into eternal hell-fire, (as they express it) before his animal life should cease by the course of nature, and without giving him 'space for repentance?' If he answers 'yes,' we shall know how to appreciate to some extent, the measure of his regard for *christian principles*. We sympathise with suffering convicts in prison, and would like to see them well treated and provided for, and allowed as much liberty as would be consistent with their safe-keeping: but we are satisfied that the custom of executing criminals has no better foundation than the vindictive superstition of the dark ages, and is in direct opposition to the mild and forgiving principles of true Christianity.

Travelling on Ice.

SKATES have been in use a long time, and may still be found in abundance, of elegant paterns and finish, at most of our hardware shops; but we think they may be in some measure superseded by an invention more in accordance with modern modes of locomotion, and requiring less skill in its management. There have been many successful experiments made in sailing on ice, and it has been repeatedly and satisfactorily proved, that the friction between polished steel runners and smooth ice, is hardly perceptible; and that the principal resistance to be overcome in travelling at a rapid rate in a nicely shod sleigh or sledge, is that of the atmosphere.

A sledge may be constructed in the manner represented at the head of this article, having a light leading wheel in front, to be operated by a person on the sledge seat, by means of a pair of light ratchet frames, one on each side of the wheel, and each containg two bars with ratchet teeth, so arranged that one row of teeth will take to those of the upper side of a small circular ratchet attached to the axle, whenever the frames are pressed forward, and those of the lower bar will take to the under side of the circular ratchet, when the frames are drawn back; each motion of the frames producing two revolutions of the wheel, which being eight feet in circumference, the forward motion will be 16 feet at each motion, or 32 feet at each pull of the frames. Wherefore, if the traveller works with only the moderate motion of thirty pulls per minute, the velocity produced will be equal to about 13 miles per hour. The expense of constructing a little vehicle on this plan, would be but trifling, and we should be pleased to see them introduced on the Hudson, Delaware or Connecticut rivers, during the present skating season.

TO ASCERTAIN THE VELOCITY OF A FALLING BODY.—Multiply the height of the fall by 64,348.—the square root of the product will be the volicity. The final velocity of falling bodies, are about the same in feet per second, as the time of their dissent in 32ds, of seconds: the velocity being in proportion to the time of the descent, but not in the direct proportion to the distance or space thereof.

Final velocities in feet per second, are four times the square root of the height of the fall in fourths of a foot. To ascertain the force of falling water per square inch, multiply the velocity in feet per second, by 484, and this product by the distance in feet that a body must fall to scquire the given velocity; the product will be the force in ounces per square inch.

PROGRESS OF THE MAGNETIC TELEGRAPH.—The whole line of telegraphs between Albany and Buffalo is expected to go into operation early in January next.

Messrs. Stevens snd Thomas, of Belleville, N. J., are supplying copper wire for the telegraphic line from New York to Philadelphia, 150 miles; Boston to Lowell 28; Buffalo to Lockport 30; Utica to Little Falls 20; Harrisburg to Lancaster 39; New York to Buffalo 450; Philadelphia to Baltimore 150-New York to Boston 240—total 1107 miles.

FLOUR OPERATION.—A mercantile house in Cincinnati purchased on the 8th of Oct., 500 barrels of flour at $3,10—sold the entire lot Oct. 21st at $3,65—re-purchased it Nov. 25th at $5, and re-sold it Nov. 27th at $5,50. The flour remained on storage in their warehouse during the whole time of these profitable operations.

Railroad Intelligence.

It is reported that the Western Railroad Company and the Boston and Worcester R. R. Company have agreed to unite under the title of the Boston and Albany Railroad Company. This arrangement will greatly accommodate the public as well as both companies.

The receipts of the Western Railroad for the year past, up to the last week in November, amount to about $620,000 being an increase of $38,000 over that of the corresponding time last year.

About 30 miles of the railroad from Edinburg to Indianapolis Ia, has been graded, and the whole distance is expected to be completed in the course of the winter. This work has been pressed forward with much energy.

A railroad from Buffalo to Detroit, on the southern shore of Lake Erie, has been advocated by a public meeting of the citizens of Cleveland, Ohio.

The work on the Little Miami Railroad, between Xenia and Springfield Ohio, is in fair progress, and is to be completed in July or August next.

Application has been made to the New Jersey Legislature for a charter to construct a railroad from Madison to Dover. It is intended to construct a section to connect Somerville with Easton; thus completing another route between New York and Philadelphia. Something should be done to break up the oppressive monopoly of the old railroads.

The Baltimore and Ohio Railroad extends 177 miles, and cost $7,623,626. The entire receipts from the business thereof since its commencement amount to 4,578,000 dolls. It has paid over all expenses, five per cent on its cost.

Measures are in progress for the construction of a railroad from Woonsocket R. I. to intersect the Worcester road near Boston.

Arrangements have been made, and contracts are being negotiated for extending the Monroe, Ga. railroad to Columbus: a company of northern capitalists having taken up the subject.

A survey is in progress, of a railroad route from Worcester, Mass. through Barre to Greenfield, or Templeton.

The Northern Railroad from Concord N. H. to Haverhill, is under contract, and has a fair prospect of going ahead.

The Mohawk and Hudson R.R.Co. have been making extensive arrangements for winter business.—If they proceed on liberal principles they will reap a liberal harvest.

The last project we have heard on this subject, is that for the construction of railroads elevated on rows of permanent columns erected in the principal streets of this city. We believe this project to be not the most visionary, however, and shall probably give an engraved illustration of the plan in a future number.

To the Mechanics of the State of New York.

FELLOW MECHANCS—We wish to call your attention to a subject of great interest to every Mechanic, not only in this State but in the United States; it is in regard to a certain Society styled the 'Mechanics' Mutual Protection,' which is alraedy established in many parts of this State. It is well worthy the attention of every Mechanic, not only as regards the principles of Benevolence, which, in this respect, is surpassed by none—but as a Protective Society, founded on the first principles of virtue and morality—to do unto others as we would they should do unto us. The former object is, we acknowledge, very essential to our welfare, but in the latter we surpass any society ever yet formed in this country; this latter object is the great point on which we are to act for the elevation of the Mechanic to his proper station in society, of which he has long been deprived and held in subjection to the will of others, who consider themselves his superiors, while in fact the mechanics are the wealth of a nation.

Practical mechanics—for be it known that none others are admitted into this society—we appeal to you to well consider your best interest and unite with us in promoting this great object. We have confidence to believe there is sufficient zeal and energy existing in the breast of every worthy mechanic in this community to unite their efforts to effect an object so desirable. It will be well here to state that we have no intention of arraying ourselves against any class of community, or bringing into disrepute those who have been so unfortunate as not to acquire a knowledge of some mechanical branch, but we do intend, by a combination of effort to eradicate some, if not all of the many evils under which the mechanic is now laboring. It is unnecessary to detail the matter further, for we hope the above will be sufficient to induce the mechanics of the city of New York to apply to some of the undersigned, or any of the members of Protection, No. 5: Horatio N. Warren, 100 Clinton st.; Geo. Downey, 44 Norfolk street; James Rutherford, 64 McDougal street; William Jones, 67 Madison street; Thomas Spotten, 118 Bowery; John L. Kirk, 65 1 2 Bowery; A. P. Myers, 23 Bowery; Alex. Logan, 139 Av. D; Charles S. Abbott, 28 Pitt; John Doremous, 148 Wooster; Gould & Henry, 109 Nassau street.

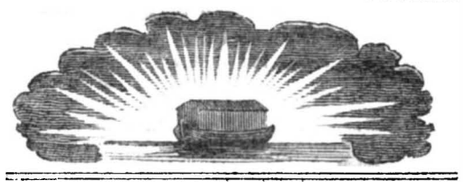
Committee.—Charles S. Abbott, Geo. W. Gould, John Henry, Alex. Logan, William Jones.

WAR MOVEMENTS IN ENGLAND.—A letter recently received by a gentleman in Philadelphia, from London, contains the following extraordinary paragraph:

'It is with the greatest regret I inform you again that the most gigantic and extraordinary military and naval preparations are making in all the dock-yards and military depots in this country, and the world says they are intended for the Americans.'

OREGON.—A delegation from Oregon has arrived at Washington, and presented a petition from the American citizens of that territory, praying that the laws and protection of our government may be extended over them. There is no doubt that Congress will immediately take some action on the subject.

It is stated that 4090 Foreigners, from Europe, principally German and Irish, were landed in this city during the last month.



Obedience to God.

"He who keepeth the whole law, but offendeth in one point," says the apostle James, "is guilty of all." The truth is, that his disobedience on this one point may be more decisive of the state of his loyalty to God, than his keeping of all the rest. It may be the only point on which the character of his loyalty is really brought to the trial, All his conformities to the law of God might have been rendered, because he thwarted not his own inclinations; and, therefore, would have been rendered, though there had been no law at all. The single infraction may have taken place in the only case where there was a real competition between the will of the creature, and the will of the Creator; and the event proves to which of the two the right of superiority is awarded. Allegiance to God in truth is but one principle, and may be described by one short and summary expression; and one act of disobedience may involve in it such a total surrender of the principle, as goes to dethrone God altogether from the supremacy which belongs to Him. So that the account between a creature and the Creator is not like an account made up of many items, where the expunging of one item would only make one small and fractional deduction from the whole sum of obedience. If you reserve but a single item from this account, and another makes a principle of completing and rendering up the whole of it, then your character varies from his, not by a slight shade of difference, but stands contrasted with it in direct and diametric opposition. We perceive, that, while with him the will of God has the mastery over all his inclinations, with you there is, at least, one inclination which has the mastery over the will of God; that, while in his bosom there exists a single and subordinating principle of allegiance to the law, in yours there exists another principle, which, on the coming round of a fit opportunity, developes itself in an act of transgression: that, while with him God be said to walk and to dwell in him, with you there is an evil visitant, who has taken up his abode in your heart, and lodges there either in a state of dormancy or of action, according to circumstances; that, while with him the purpose is honestly proceeded on, of doing nothing, which God disapproves, with you there is a purpose not only different, but opposite, of doing something which he disapproves. On this single difference is suspended not a question of degree, but a question of kind. There are presented to us not two hues of the same color but two colors, just as broadly contrasted with each other as light and darkness. And such is the state of the alternative between a partial and unreserved obedience, that while God imperatively claims the one as his due. He looks on the other as an expression of defiance against Him, and against His sovereignty.—*Chalmers.*

FAMILY PRAYER.—In binding a family together in peace and love, there is no human influence like that of domestic prayer. Uniting them in a common object, it unites their sympathies and their desires. Raising their hearts to heaven, it brings them altogether, in the presence of God. The family altar is an asylum to which they repair from the care and toils of life. Reminding them of the rest reserved in heaven, it unites them in the efforts of faith and obedience for its attainment.—Earth has no holier spot than a house thus sanctified by prayer; where the voice of supplication and thanksgiving consecrates every day, where the word of God is devoutly read, and all unite to show forth His praise. It may be humble, but it is holy, and therefore heavenly. Poverty may be there, and sorrow; but its inmates are rich in faith and joyous in the Holy Ghost. Sickness and death may enter it; but they will be angels of peace and mercy, and the spirits whom they release from the imprisonment of the flesh, will be united, free and happy, to worship forever, as earth did not permit them—a family in heaven.

LIVE NOT FOR YOURSELVES.—Live not merely for yourselves, but also for the good of others. Selfishness contracts the soul, and hardens the heart. The man absorbed in selfish pursuit, is incapable of the sweetest, noblest joys of which our nature is susceptible. The author of our being has ordained laws, according to which the most exquisite pleasure is connected, not with the direct pursuit of our own happiness, but with the exercise of benevolence. On this principle it is, that he who labors wholly for the benefit of others, and as it were, forgets himself, is far happier than the man who makes himself the centre of all his affections, the sole object of all his exertions. On this principle it was, that our Saviour said, 'it is more blessed to give than to receive.' Resolve, therefore, to lead lives of usefulness. Be indifferent to nothing which has any relation to the welfare of men. Be not afraid of diminishing your own happiness, by seeking that of others. Devise liberal things, and let not avarice shut up your hand from giving to him that needeth, and to promote the cause of piety and humanity.

JUVENILE FAITH.—A Vermont paper relates an anecdote of a little boy who, while repeating the Lord's prayer, when about going to bed, and having proceeded as far as 'Give us this day our daily—' turned to his mother with the proposition, 'O, mamma, let me ask for *cakes*.' This anecdote, which is by no means improbable, affords an instance of genuine faith in the child which is rarely to be met with, even in those who make a long and loud profession; and contrasts boldly with that of the clergyman who, being requested to pray for rain, in a time of severe drouth, replied, 'I have no objection to pray for rain to oblige you, but it will be of no use while the wind continues in this quarter.'

A man's first care should be to avoid the reproaches of his own conscience; the next the censure of the world.

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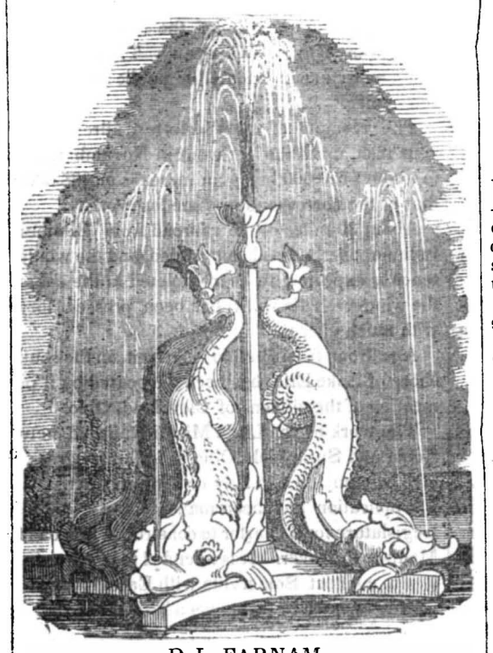

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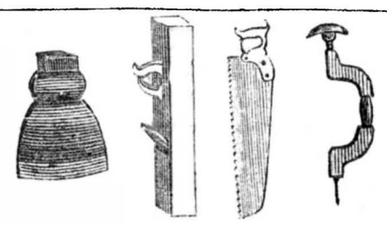

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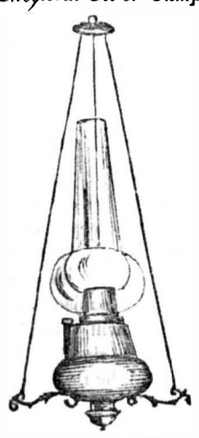

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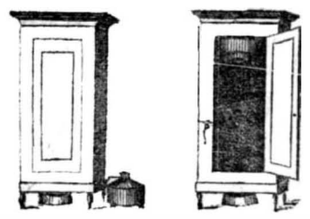

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